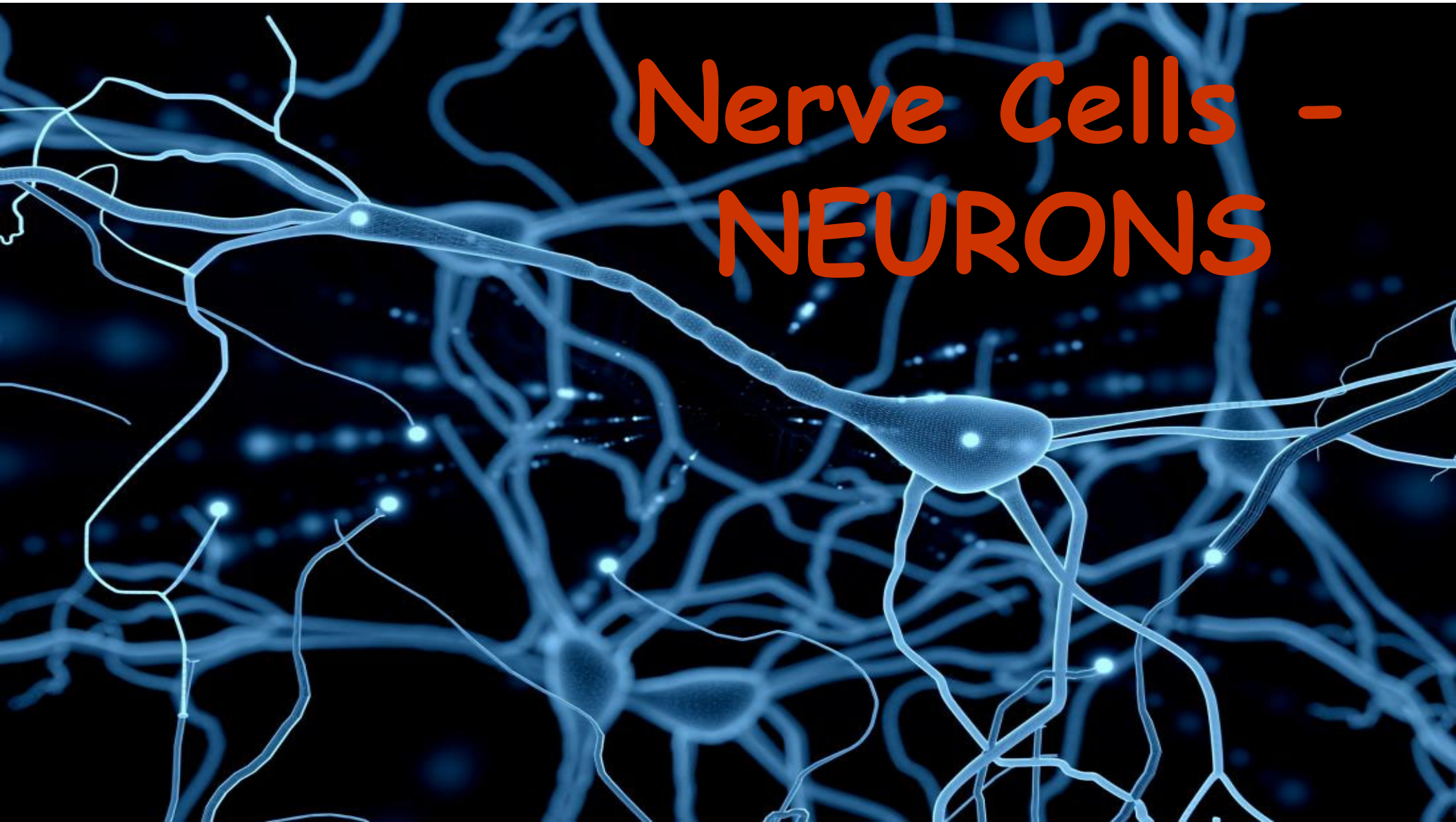


Scientists in Synagogues Series: The Biology of the Nervous System/The Polyvagal Theory February 21, 2021

Dr. Angela Cristini, Ph.D.
Professor of Biology
VP Institutional Advancement
Ramapo College of New Jersey

Nerve Cells - NEURONS



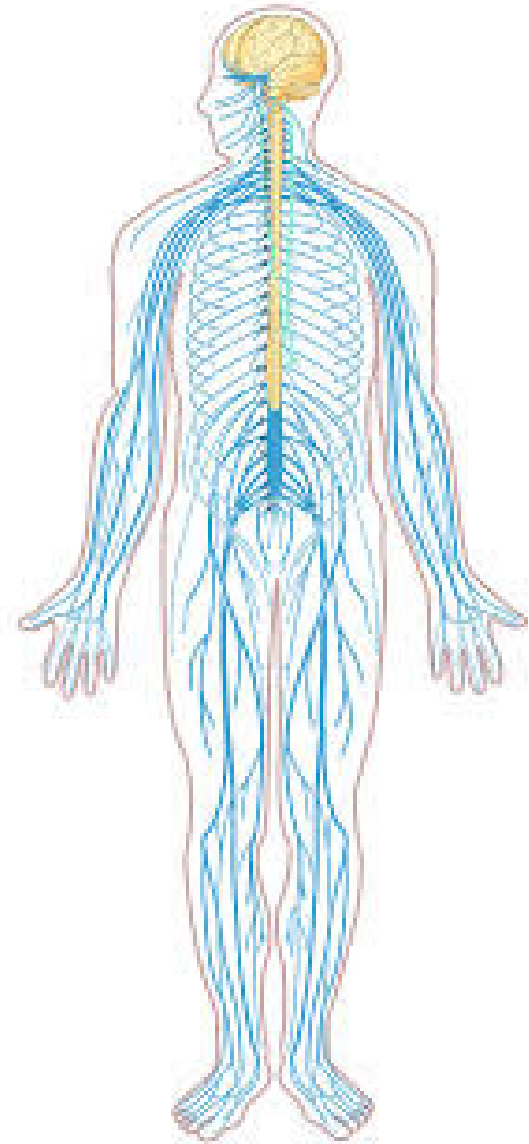
NEURONS

form nervous systems

1. Detect

2. Integrate

3. Respond



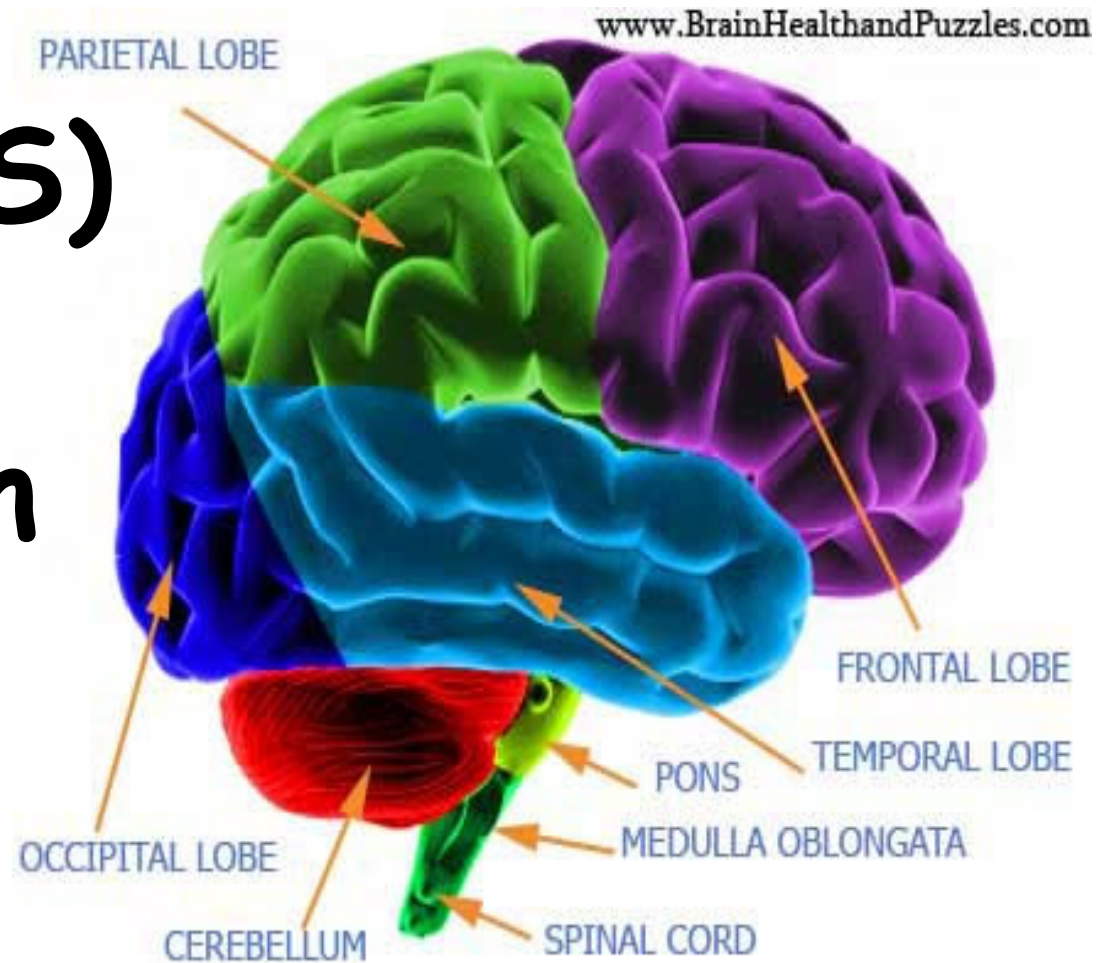
Nervous Systems

- Central (CNS)
 1. Brain
 2. Spinal cord



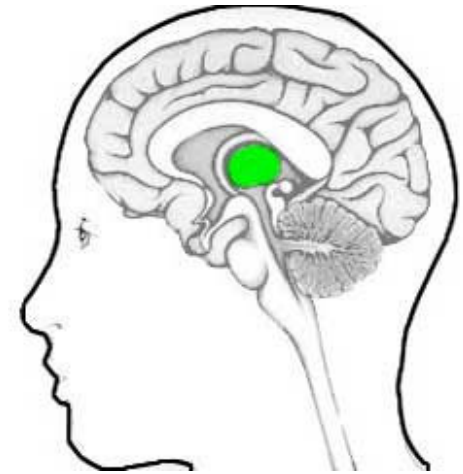
Central (CNS)

1. The Brain



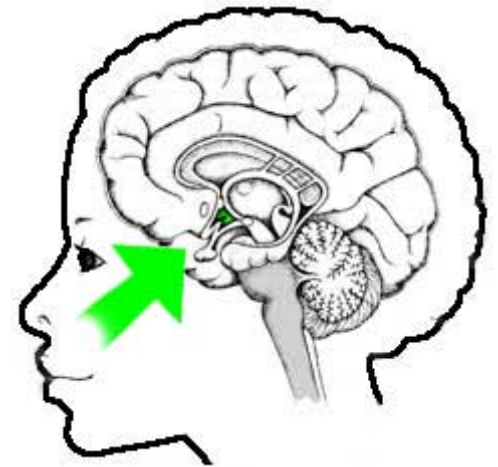
Thalamus

- Two-way relay station for messages traveling into and out of the brain
- Filters and directs most sensory information to appropriate parts of the brain
- Plays a role in storing and retrieving memories



Hypothalamus

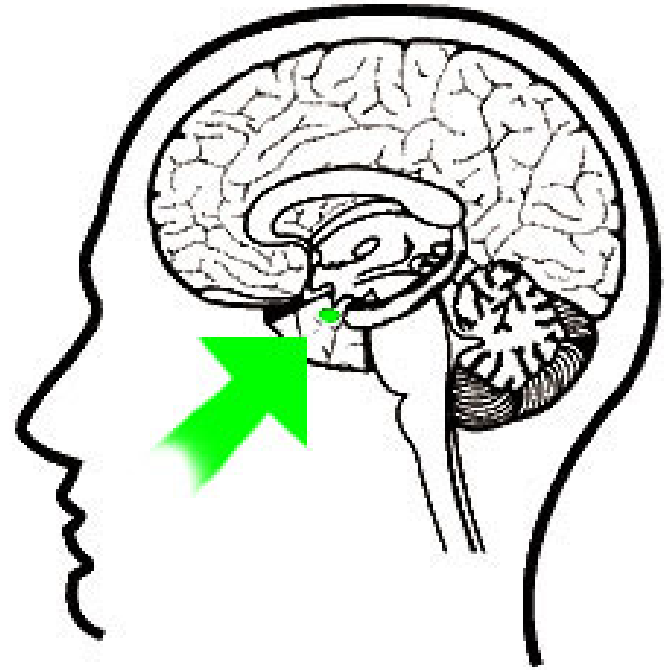
- Regulates body temperature, thirst, hunger, blood pressure
- Controls the release of hormones from the pituitary gland
- Links the **nervous system** to the endocrine system



Amy and Amyl Who??

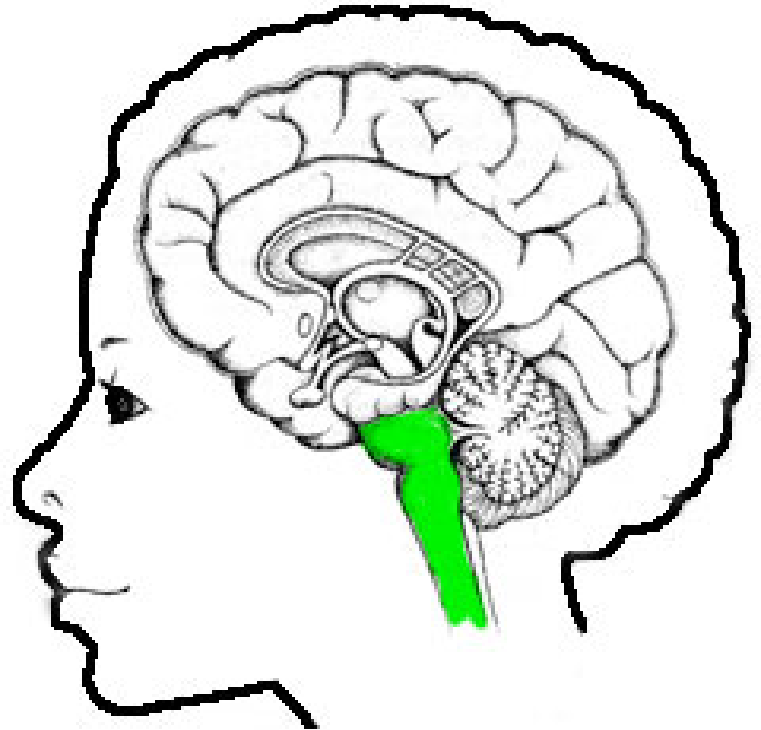
Amygdala

- Emotions and forming emotional memories
- Integrates senses and links them with emotions
- Affects feeding, sexual arousal, and the "fight-or-flight" reaction



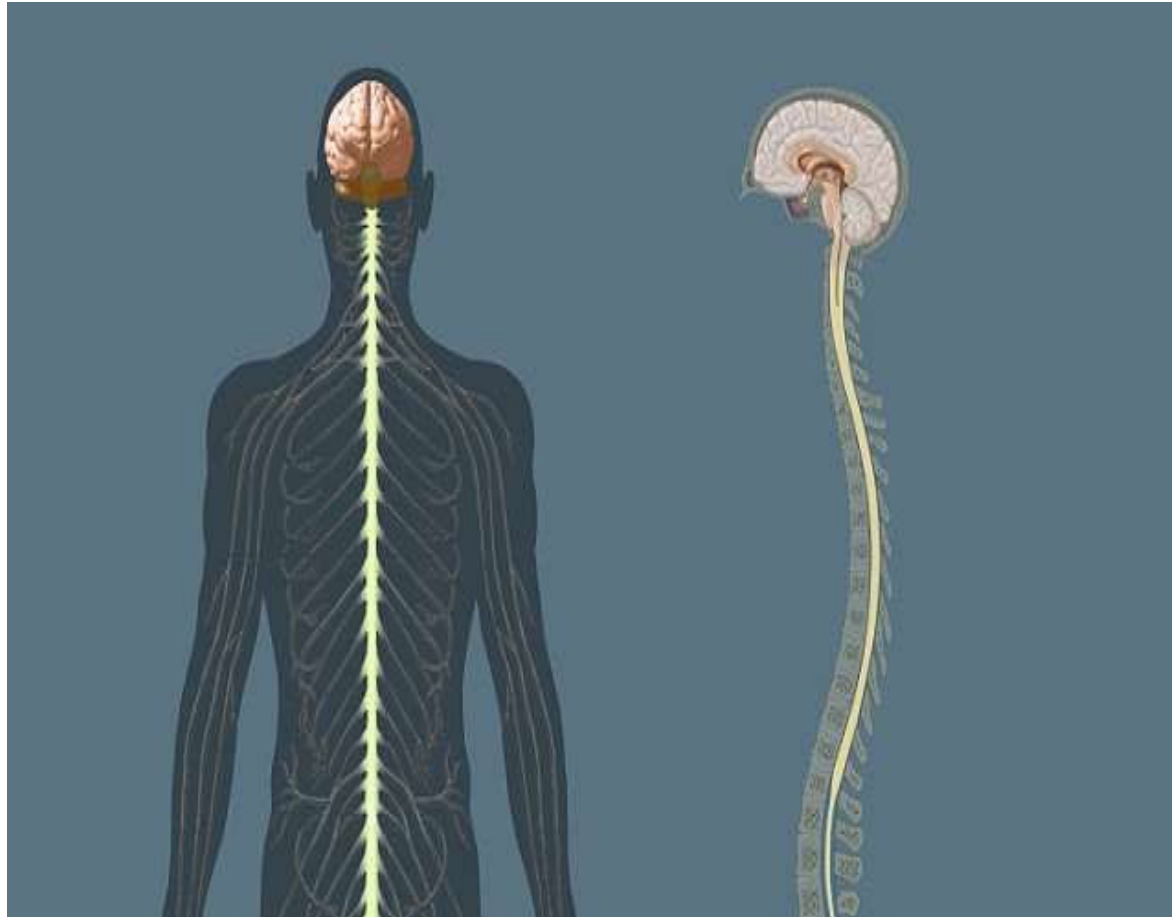
Brain Stem

- Connects to the spinal cord
- Controls heart rate, breathing, digestion, sleep
- Communication between CNS and nerves throughout the body
- Has set of nerves that send and receive signals to the face, mouth, tongue, eye muscles, ears, and balance-sensing organs



Central (CNS)

2. Spinal Cord

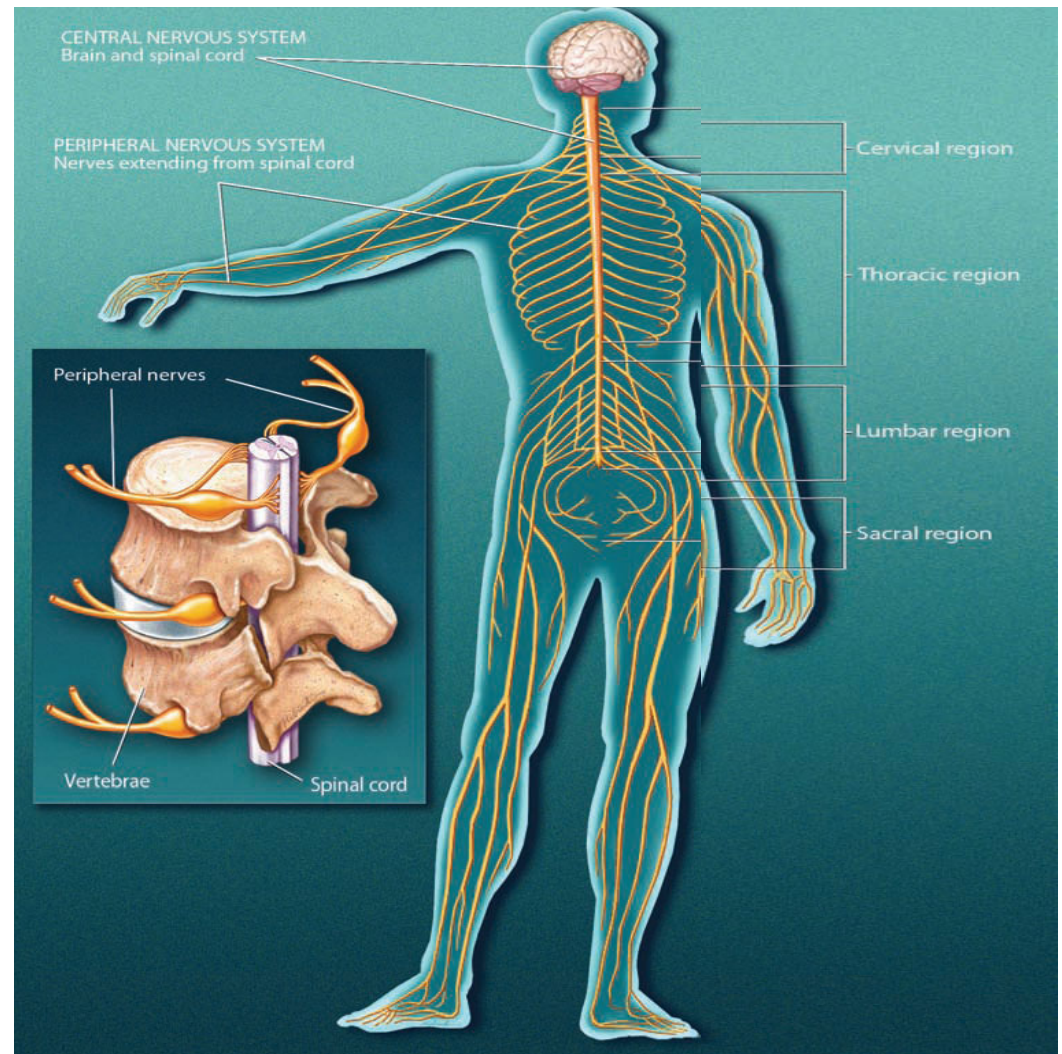


Nervous systems

Peripheral (PNS)

A. Nerves extending from the spinal cord

1. Somatic
2. Autonomic

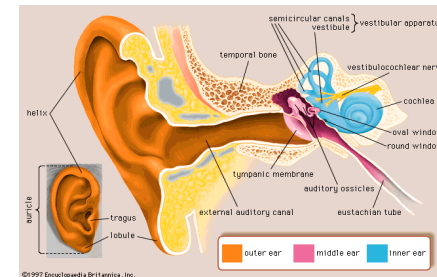
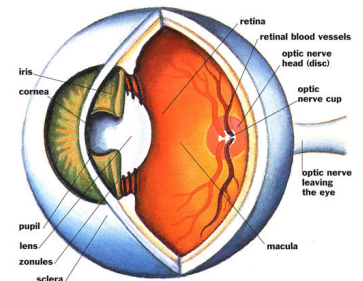
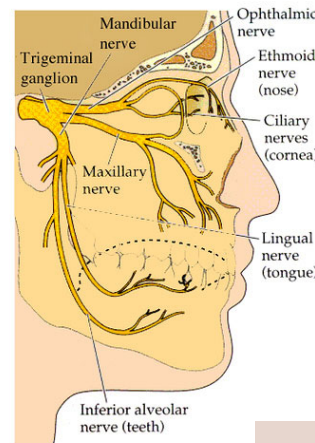


Peripheral (PNS)

Somatic

Sensation and Perception

- Thermo reception
- Touch (including pain)
- Chemoreception
- Visual reception
- Auditory reception
- Proprioception



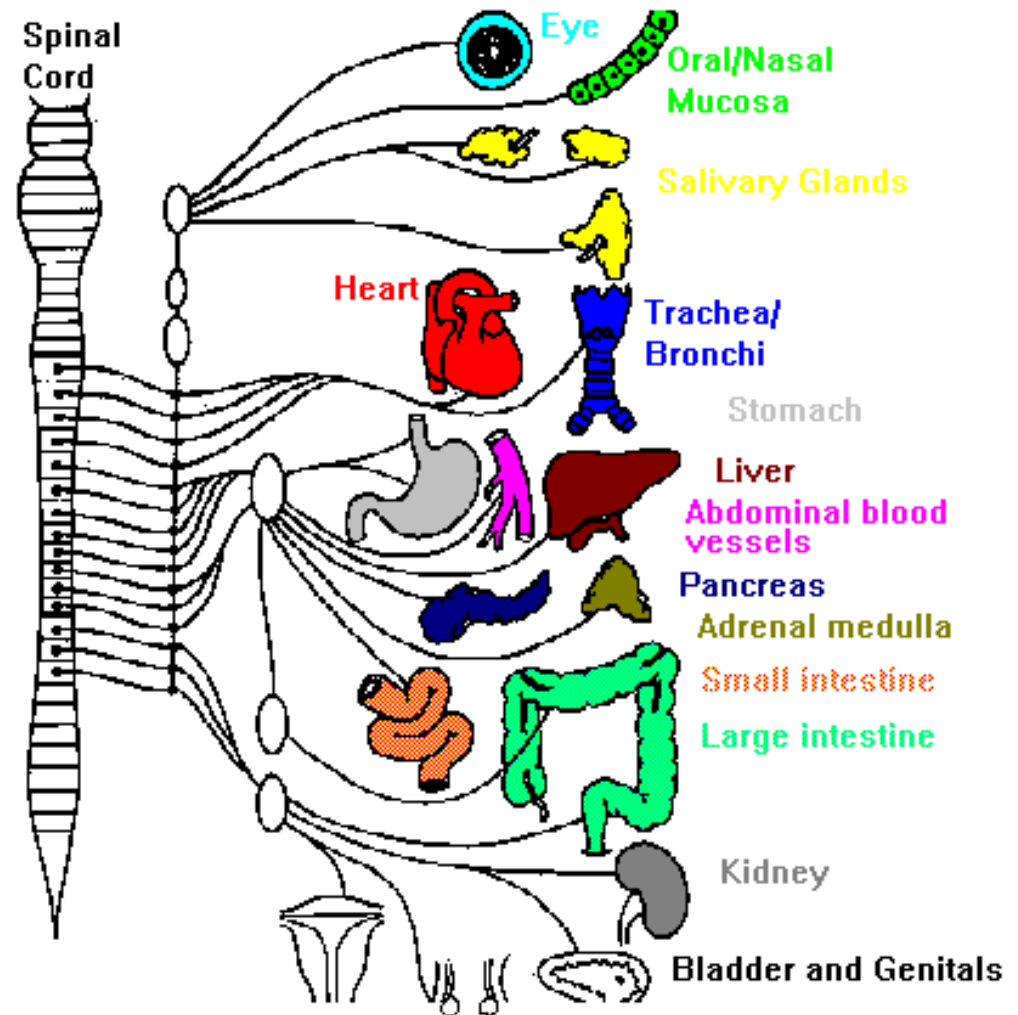
Peripheral (PNS)

Autonomic

1. Sympathetic

“Flight or Fight”

Norepinephrine



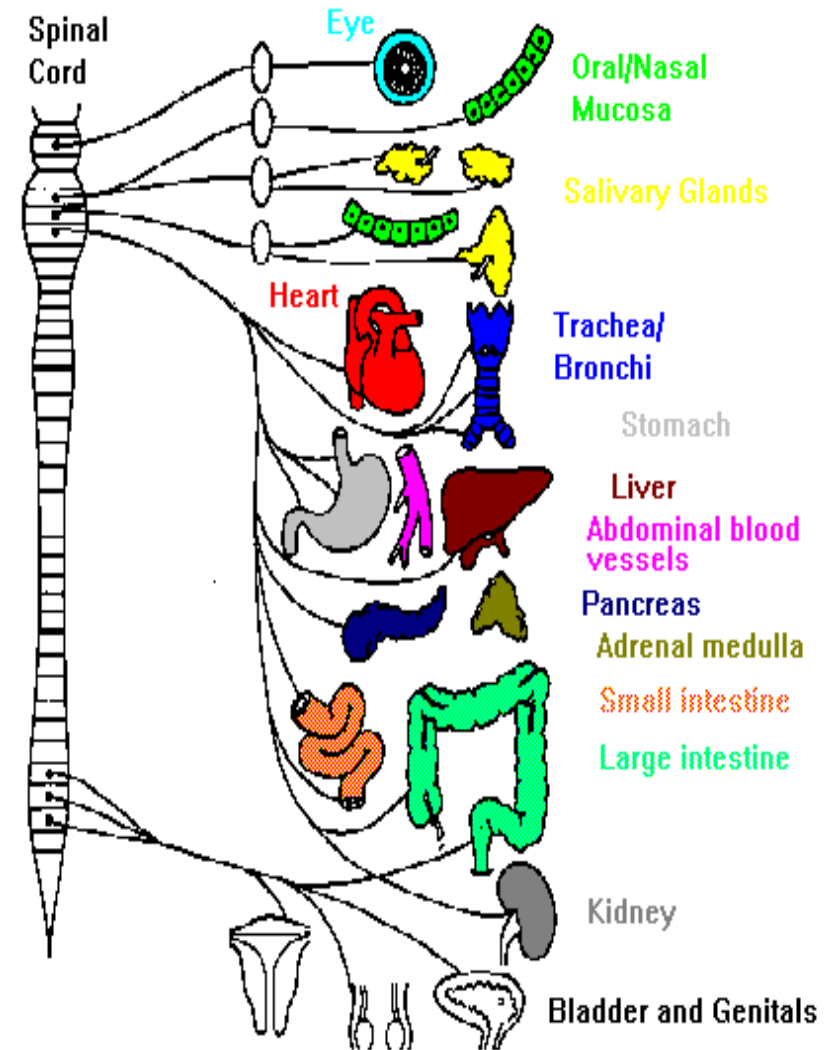
Peripheral (PNS)

Autonomic

2.Parasympathetic

“Rest and Digest”

Acetylcholine

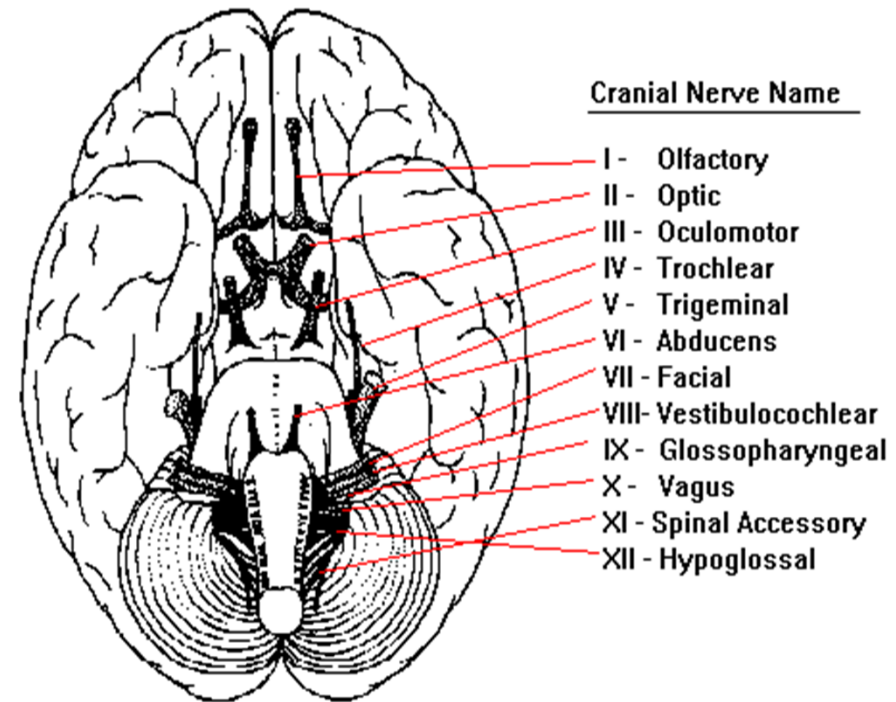


Peripheral (PNS)

B. Nerves extending
from the brain

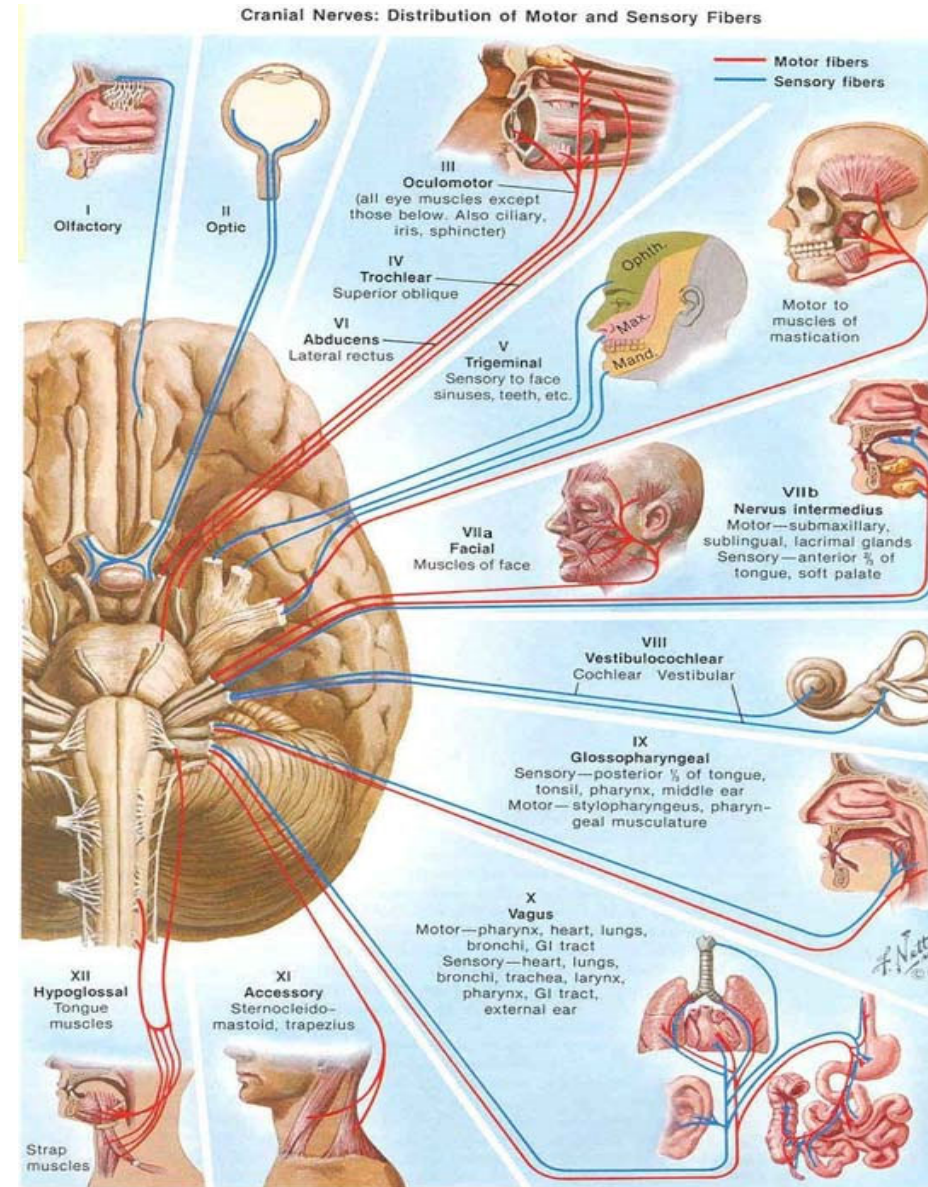
The 12 Cranial Nerves

On Old Olympus Towering
Top A Famous Vocal
German Viewed
Some Hops



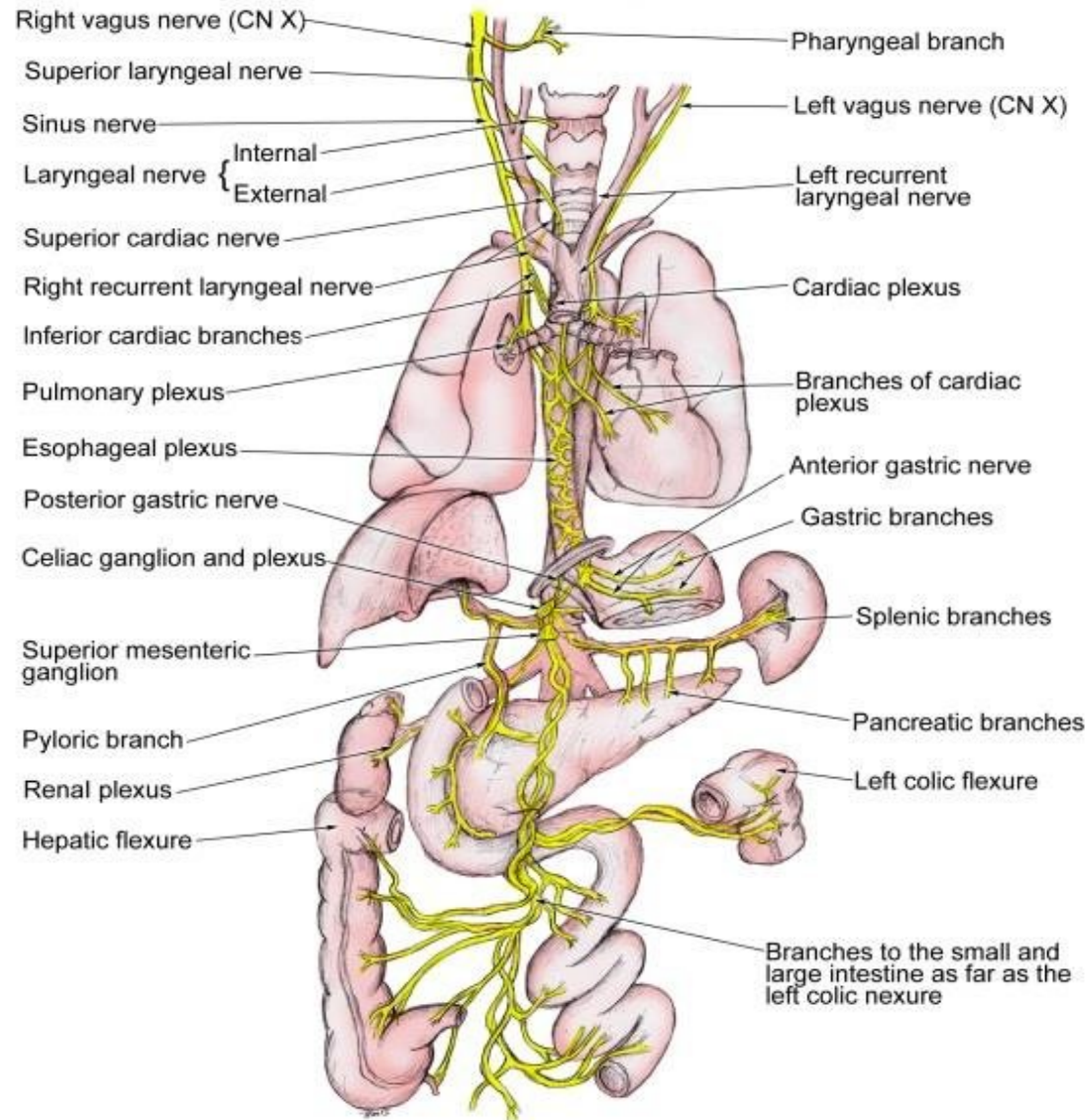
Cranial Nerves

- Some bring information from the sense organs to the brain
- Others control muscles
- Others are connected to glands or internal organs such as the heart and lungs



#10 Vagus

- Longest - from Medulla to Colon
- Motor and Sensory
- Sends information to brain from organs
- Receives information from brain to organs



#10 Vagus

Sensory Functions

- Ear and parts of the throat
- Larynx, esophagus, lungs, trachea, heart, and most of the digestive tract
- Taste near the root of the tongue

Motor Functions – Parasympathetic

- Pharynx, larynx, and the soft palate
- Heart (helps lower resting heart rate)
- Involuntary contractions in digestive tract – esophagus, stomach, most of the intestines

Thank You !
Questions?

